

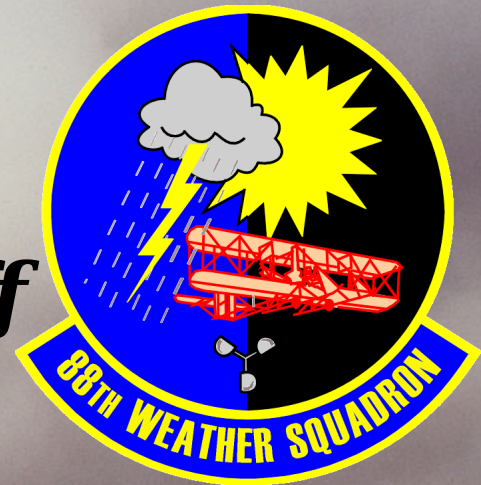
88th Weather Squadron

The AFMC Staff Meteorology Hub



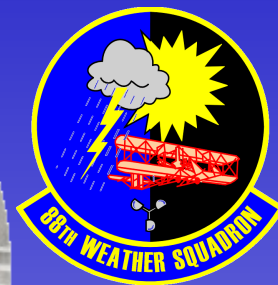
*Leading-Edge
Meteorology for*

Staff





Mission

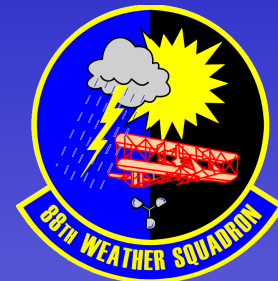


Electronic Systems Center

Space & Missile Center

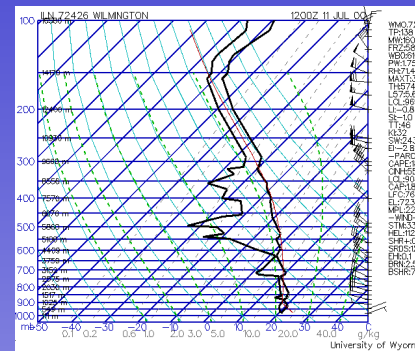


Team with acquisition and R & D programs to provide expert aerospace environmental consultation



Data

► ***Weather/environmental conditions*** your system is likely to encounter.



Tailored Products

► ***Environmental specifications for your system.***

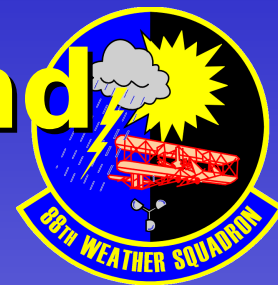
Consultation Education

► Help you design a system better able to *exploit the environment*.





Improving Capability and Lowering Cost



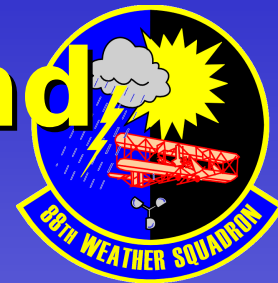
Tactical surface weather observations with remote readout up to 10 miles to support customer program tests

Radiosonde/atmospheric sounding capability to support Open Skies and other programs; purchased \$90K system for just \$20K





Improving Capability and Lowering Cost



TURBCAT V1.5 Beta
Help About Exit

User Input

Military Aircraft:

- A-10
- B-1B UNSWEPT
- B-2A
- B-52H
- C-130
- C-17A
- C-141B
- C-5A/B
- C-9A/C

Aircraft Category:

☒ Military

☐ Civilian

Gross Weight (1,000 lbs):
(i.e. enter 20 for 20,000)

True Airspeed (kts):

Altitude (MSL, 1,000 ft):
(i.e. enter 30 for 30,000 ft)

Program Output

Aircraft Name:

Gust Sensitivity:

Turbulence Category:

Category Table

Turb Category	Sensitivity Range
I	>= .040
II	.030 - .039
III	.021 - .029
IV	<= .020

Aircraft Properties

Mean Aerodynamic Chord (ft.):

Wing Area (sq. ft.):

Aspect Ratio:

Taper Ratio:

Wing Sweep (deg.):

Turb Cat Program to calculate turbulence for military and civilian aircraft

Saved C-130J
\$500K during
crosswind testing





Improving Capability and Lowering Cost



Supported atmospheric analysis of Airborne Laser Program to show effects of environment on system and develop advanced decision aid



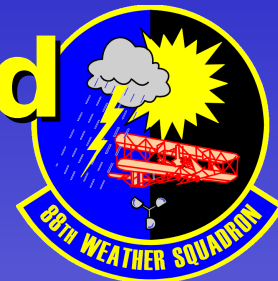


Improving Capability and Lowering Cost



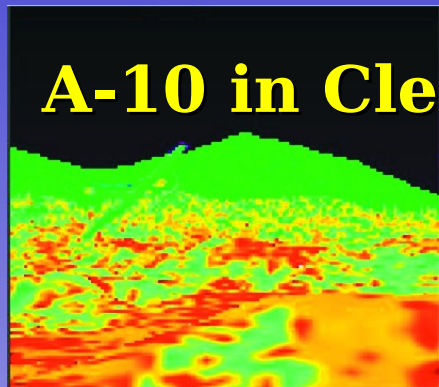
Managing initiative to install 50-MHz wind profiler in ROK to support U-2, ABL, UAV, NBC, Leaflet and Patriot operations





Improving Capability and Lowering Cost

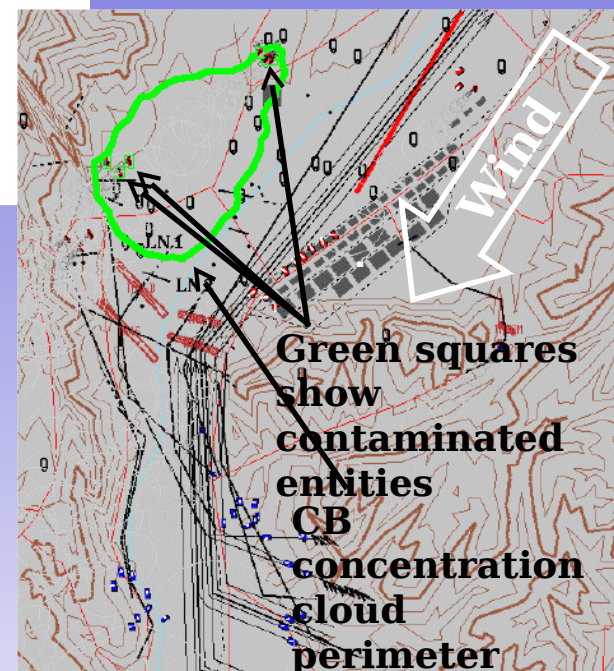
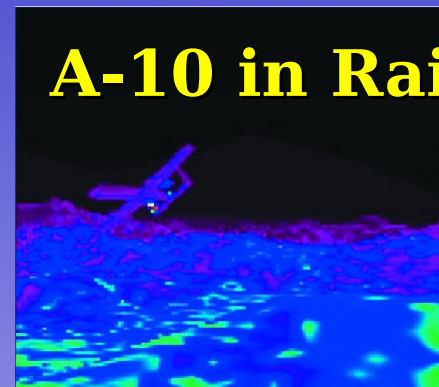
A-10 in Clear



Supported development of JMASS EO/IR Environment Player with 3D MODTRAN and Cloud Scene Simulation Model (CSSM)

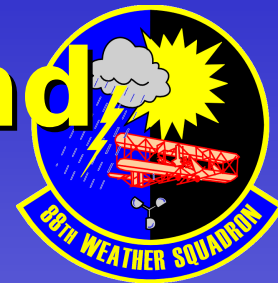
Leveraging DoD and DMSO natural environment M&S capabilities, such as MEL, ESG, EnviroFed, ACMES, for customer programs

A-10 in Rain





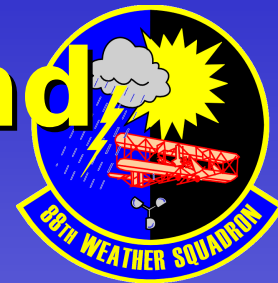
Improving Capability and Lowering Cost



\$3.8M proposal to demonstrate capability to fly weather sensors on UAVs like Predator or the Loitering Electronic Warfare Killer (LEWK) and provide real-time weather data to warfighter.



Improving Capability and Lowering Cost

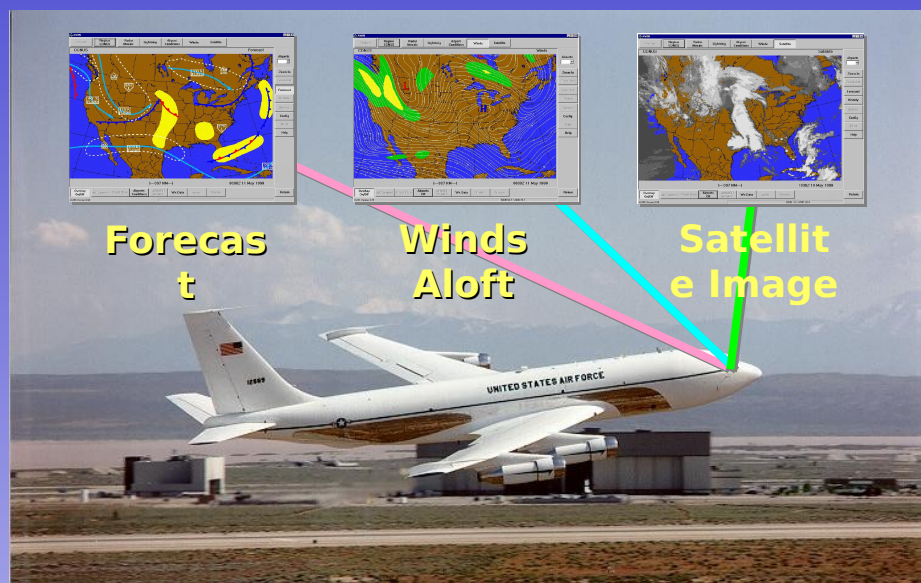
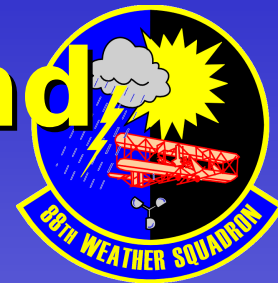


Support to Global Hawk test flights, Australian deployment, and Operation ENDURING FREEDOM deployment and employment operations





Improving Capability and Lowering Cost



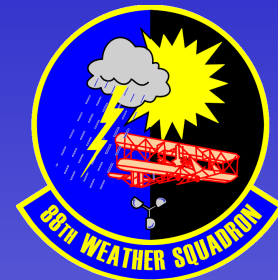
Spearheaded efforts to get weather information into and from in-flight aircraft to help safety, efficiency and mission effectiveness

Provided SensorCraft cloud, atmospheric transmission and icing information supporting studies of this future technology

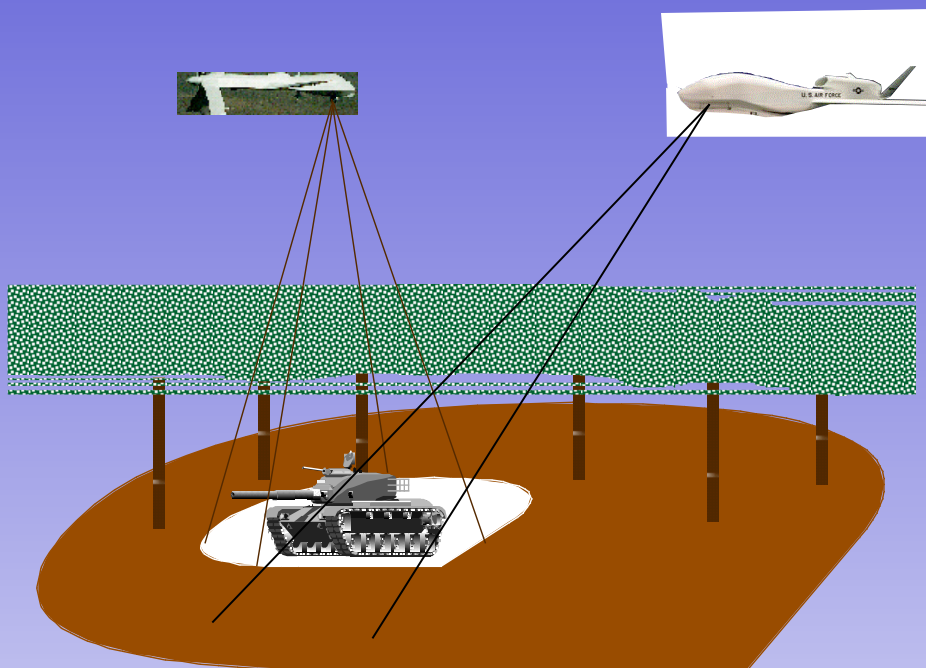




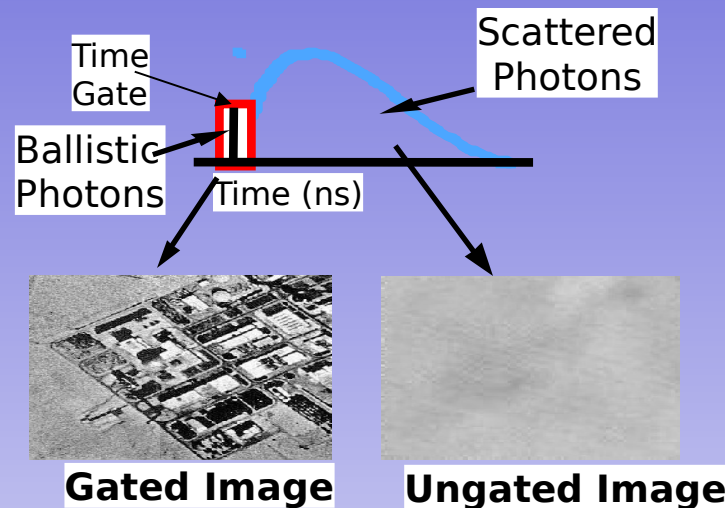
Improving Capability and Lowering Cost



Integrated into current sensor research, which will allow new sensors to image through obscurations.



1) Gated imaging is used to remove the large background from the foliage





Improving Capability and Lowering Cost

Camouflage Images from Nevada



4_2e_236_25

Shadow from person
under camouflage

4_2e_257_8

3_2d_0_14

Depth of field ~ 25 ft

4_2e_236_4

Square root (4_2e_254)

Sum frames 1-25

Image blur from plane movement [correlation routine not available at this time]

Delay time for acquiring image set to ~ middle of truck, not leading edge

4_2e_237_4

Ambient light
image

Note: these files names do not match the correct test card number, ie test card number should be 2d not 2e.



Improving Capability and Lowering Cost



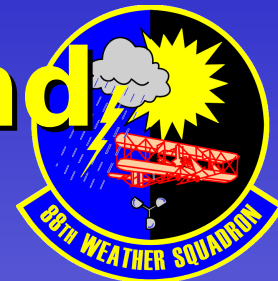
**Provided cloud free
line of sight
probabilities, delta
background to target
temps, and
atmospheric
transmission**



**Provided worldwide
stratospheric climatology
data and environmental
consultation services to
Propulsion Directorate's**



Improving Capability and Lowering Cost



Supported AFRL Military Space Plane Conference, evaluated published space and terrestrial environmental thresholds.

**or
wi**

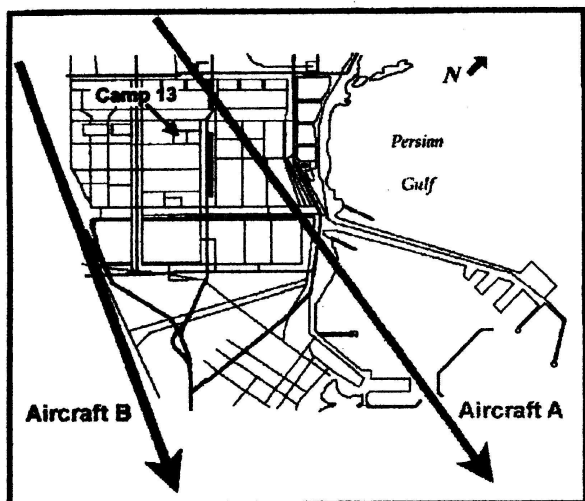


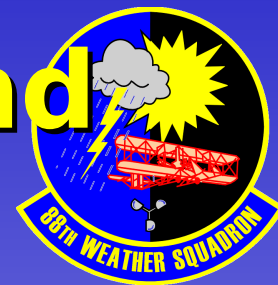
Figure 5. Flight paths of aircraft that caused the loud noise (sonic boom)



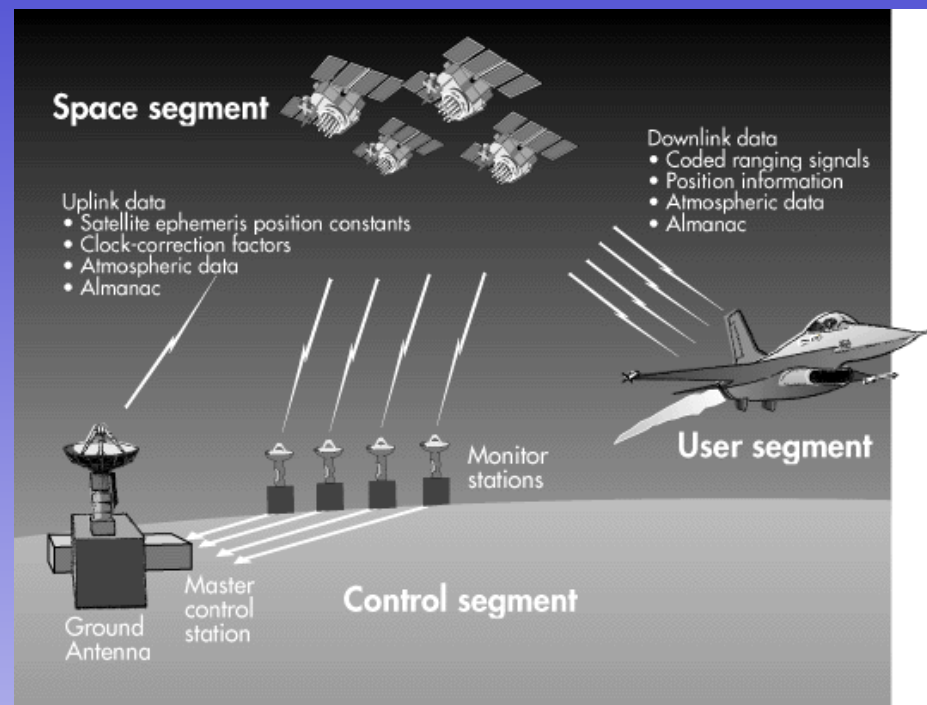
Responded to inquiry from AFRL/HECB regarding OSD's investigation of a DESERT STORM sonic



Improving Capability and Lowering Cost



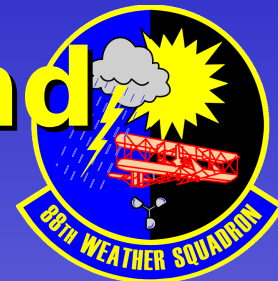
As outgrowth of 96-97 Joint GPS ionospheric scintillation solar max experiment, we supported Sensors' new proposal for expanded GPS simulation



Researched worldwide dust and raindrop size distributions to assess erosion effects on infrared transparencies



Improving Capability and Lowering Cost



Helped develop detailed work-around procedures to reduce B-2 aircraft engine induction icing-- estimated cost

av
po



Our work on aircraft coating/weather interactions resulted in a documented **50% man-hour savings** on critical B-2 maintenance tasks-- fleet is now cheaper to



Improving Capability and Lowering Cost



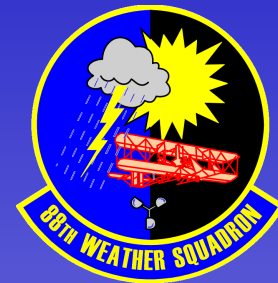
Climatological and flight temperature profile analysis for the C-17 SPO led to better test site selection and realistic low temperature design criteria for new weather



**Atmospheric icing studies for the F-22 SPO helped define anti-icing equipment needs
Staffmets supported recent \$2M testing effort at Eglin AFB**



Improving Capability and Lowering Cost



NAIC Support using intel assets to provide real-time weather info to the warfighter

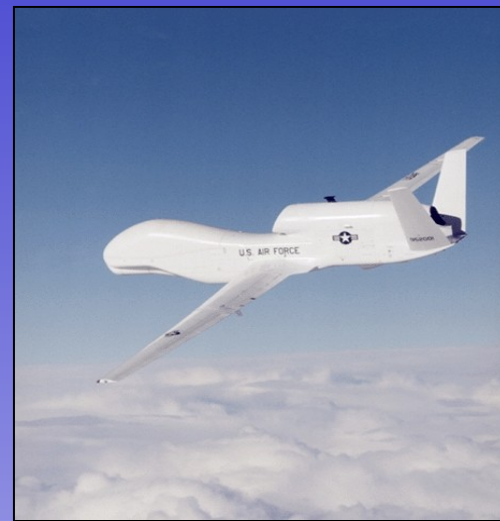
Independent weather review for C-23 Sherpa Crash Investigation Board





Contingency/Exercise Support

- **Operation ALLIED FORCE**
 - Provided specialized real-time weather support with NAIC
 - Led to go/no-go decisions on strike packages, ATOs, and target determinations



- **Operation ENDURING FREEDOM**
 - Deployed staffmet to provide specialized weather forecasts for Global Hawk operations
 - Acquisition Surges - Support to SPOs, AFRL and ASC Emergency Council





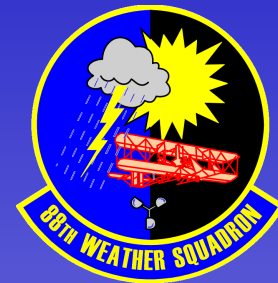
AFW's LINK TO ACQUISITION WORLD



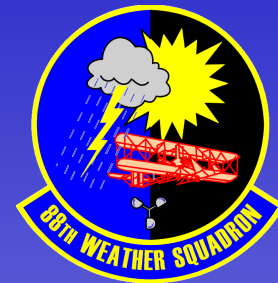
- **Consultation with AFWA and UAV Battlelab on initiative to test weather sensors on UAVs**
- **Participation in METOC Working Group for Joint Mission Planning System**
- **Space IWEDA Working Group**
- **Modeling & Simulation Executive Agent for Air &**



NEW CAPABILITIES



- Improved communications among staffmets command-wide: the “virtual staffmet hub”
- SIPRNET Connectivity - Improved capability to support classified projects
- Mesoscale models now run on Sun Workstation for sensitivity studies; R & D post-analysis
- Vaisala \$90K radiosonde equipment for R&D post-analysis, operational weather, OPEN SKIES support
- DigiWx tactical wireless surface weather observations with remote readout up to 10 miles away to support customer programs



“As our weapon systems become more sophisticated and weather sensitive, we become more [not less] weather dependent.”

DoD Inspector General Report on Operation ALLIED FORCE

“ In any combat operation or any conflict, weather's probably your No. 1 concern.”

Gen. Richard Myers, chairman of the Joint Chiefs of Staff



We Are Ready to Help



Our services are provided at
NO COST
to you !

88th Weather Squadron Commander

Lt Col John Egentowich

DSN 785-2207 or (937) 255-2207

email: 88ws@wpafb.af.mil

<http://weather.wpafb.af.mil>